Special Report

Selected methods of animal carcass disposal

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Georgia's Dead Animal Disposal Act indicates that prompt disposal of dead animals is necessary to prevent the spread of infectious and contagious disease. Similar state acts regulate the disposition of animal carcasses in most of the United States; however, approved methods vary with animal species and state. As veterinarians, we understand the importance of proper disposal of animal carcasses and could serve our clients well by acting as a source for this information. Several methods of carcass disposal are commonly used, including burial, composting, incineration, and rendering.

Pit burial—In states where it is approved, pit burial is by far the most widely used method of carcass disposal for animal agriculture facilities with numerous animals such as poultry or swine. Geographic regions where the water table is deep and the soil type is non-porous are best suited to this disposal method. In locations where the soil is sandy, the sides of the pit must be reinforced, either through the use of fabricated walls or a 3-ft-diameter concrete pipe, such as that used under roads for drainage, placed on end. Pit burial is popular because it can be accomplished quickly and easily. Burial pits often are highly regulated and inspected by the state Department of Agriculture to assure compliance and minimize the potential for ground-water contamination. These regulations vary among states. In Georgia, for example, poultry pits cannot be located within 100 ft of a well or water line, within 15 ft of the edge of an embankment, or within 100 ft of ponds, lakes, streams, or tributaries.

Information regarding pit construction can be obtained from the Georgia Department of Agriculture. In general, pits should be no deeper than 8 ft to avoid entering the water table. The top of the pit must be of solid construction with a tight-fitting lid or cap. The top must be sealed to prevent the entry of rodents, insects, and rainwater and prevent the escape of odors. The typical life span of a pit will depend on the animal species and the size of the pit, which for poultry is usually 16 to 36 ft²; a pit of this size will last approximately 5 years. This is 1 of the least expensive methods of disposal for large numbers of carcasses; cost is approximately 0.75 to 4.24 cents/lb.

Individual burial—Individual burial is allowed, but state regulations should be consulted before burying carcasses, because there may be restrictions on the number of pounds per acre per year that may be buried. Individual carcass burial is approved in all states that regulate animal carcass disposal, with variations in the required depth ranging from 0.5 to 6 ft deep; 3 to 4 ft of dirt covering the carcass is the most common requirement. With large carcasses, such as those of cattle and horses, a trench 7 ft wide and 9 ft deep is typically needed. A mature cow requires 14 ft² of trench floor space. Because 1 to 2% of dairy cows die on farms each year, large farm operations may eventually run out of space for these trenches and require other disposal methods.

Landfilling—Landfilling is an alternative in some locations, but not all municipal landfills will accept carcasses, and costs may be high. Individual municipal landfill requirements should be checked, because some demand double bagging of the carcass. This method is commonly used for companion animals. Certain municipalities offer pickup services for carcass disposal, but dead-animal collectors must be licensed.

Composting—Composting is defined as controlled decomposition of organic materials and is a sanitary and practical method of carcass disposal that has recently gained popularity. During composting, bacteria break down the carcass, leaving only feathers and bones. When properly performed, composting is safe and produces an end product that is a fairly odorless, spongy, and humus-like substance that is a valuable soil supplement. Typical fertilizer values for finished compost are 25 lb of nitrogen/ton, 13 lb of phosphorous (as P₂O₅)/ton, and 7 lb of potassium (as K₂O)/ton. Compost can easily be applied to fields with a standard manure spreader. Farmers who use this method of carcass disposal must obtain a permit from the state’s Department of Agriculture. Guidelines for placement of composters have been developed to avoid runoff and drinking-water contamination during high-water periods. Composting of carcasses can also be accomplished with covered piles or in trenches, but the same principles regarding runoff apply. Detailed instructions on composting methods can be found in the literature. This method of disposal costs approximately 2.1 to 8.4 cents/lb.
In some locations, there may be restrictions on the size of the animal that may be composted, although in states where the process is approved, swine and cattle producers have used this method successfully. Large animals may compost more quickly if partitioned or cut open prior to composting. It takes 9 to 10 months to compost intact pig and cattle carcasses. Because of the extremely high heat required to denature the prion responsible for transmissible spongiform encephalopathies, composted mammalian tissues should not be used on human food crops. However, during proper composting the tissues reach 130°F for 3 days, which should kill most pathogenic viruses and bacteria except for spores. Other restrictions on composting may involve the use of the composted material. Local regulations should be checked before constructing a composting facility. Some states require a training program for persons to become certified to compost sheep, swine, and cattle.

**Tissue digestion**—Tissue digestion of animal carcasses is achieved by alkaline hydrolysis. This process, most commonly used at a diagnostic laboratory or in an industry setting, uses a strong alkali at high temperatures to solubilize and hydrolyze tissues and results in a neutral solution of amino acids, peptides, sugars, and soap that is suitable for release into a sewer. The only solid end products are the minerals from the bones and teeth, and the process destroys toxins. Cost, environmental impact, and other information on this process can be found at www.wr2.net.

**Incineration**—Incineration is probably the most biosecure method of carcass disposal, but it is costly. A 500-lb capacity incinerator costs approximately $3,000.00 and lasts approximately 4 years. The actual cost to incinerate is variable depending on the local cost of propane fuel but is approximately 4.3 to 10.75 cents/lb. Results of 1 study indicate that incineration via modern equipment actually costs less than composting for the disposal of chicken carcasses. When operating properly, incinerators produce little odor. Some states require a permit to install and operate an incinerator. To prevent air pollution, guidelines on this method of disposal are regulated by the federal Environmental Protection Agency (EPA) as well as the state EPA. This method is commonly used for poultry, companion animals, cattle, and sheep.

**Rendering**—Rendering cooks the carcasses to destroy pathogens and produces usable end products such as meat, feather, bone, and blood meal that can be used in animal feeds. This is an environmentally safe method for disposal of dead livestock and is used in approximately 50% of the states, being the primary method of recycling offal from meat processing plants. There are restrictions on rendering sheep, goats, cattle, and farm-raised deer or elk in some areas because of concern that agents of transmissible spongiform encephalopathies could be transmitted by the resulting meat meal. Poultry carcasses are generally not rendered with mammals, because the feathers require a higher heat process that damages other proteins. Therefore, the separate rendering facilities that are required for poultry will limit the availability of this method in some areas of the country.

Freezing stabilizes the carcass and reduces decomposition prior to rendering that can result in reduction of protein quality. Some rendering companies provide freezers that are placed on the farm. In other situations, the producer must provide the freezers to hold carcasses. The producer labor associated with rendering is similar to that for burial pits; carcasses are simply deposited in the freezer daily. When the freezer is full, the rendering company picks up the carcasses and transports them to the rendering facility. Cost of leasing a freezer and receiving pick-up service is approximately $2,100/y, and the cost of the electricity to run the freezer is additional. Overall, cost of this method is approximately 5.25 to 12.15 cents/lb.

Farms without freezers must locate the carcass in a dry area where runoff or drainage is not a problem. Carcasses intended for pickup should be hidden from view and protected from wild animals and birds. In addition, entry of the rendering truck onto animal production or animal health facilities presents a biosecurity risk. Limited pickup schedules may preclude rendering as a viable option. If a pickup service is not available, carcasses should be transported by the producer to the rendering plant in a sealed and leak-proof container such as a sealed plastic garbage can as soon as possible. A reasonable disposal time is 12 to 24 hours.

**Poultry**—There are a few additional methods for disposal of poultry carcasses that may be approved on an individual basis. These methods include feeding poultry to alligators that are confined and commercially farmed, anaerobic bacterial fermentation of carcasses to stabilize the protein through acidification before transportation to a rendering facility, and sealed digesters that act much like septic systems. Each of these methods of disposal is inspected and is subject to regulations for proper carcass handling to protect public health and ensure environmental safety.

**Sheep**—In some locations, rendering of sheep carcasses is allowed, whereas elsewhere landfilling or incineration is the only approved method. Reimbursement for sheep with a transmissible spongiform encephalopathy may be provided by an indemnity program and such sheep must be disposed of under federal and state guidelines. Some landfills in Colorado require a separate common pit for sheep. These pits are approximately 8 ft deep, and carcasses are covered daily with lye. In 1 area of Colorado, small ruminants have been processed and fed to zoo animals.

**Cattle**—Most commonly, rendering plants pick up dead cattle unless the region prohibits rendering of bovine carcasses because of concern over transmissible spongiform encephalopathies. In some instances, feeding these carcasses to scavenging animals is used, although this is not a desirable method of disposal. A serious drawback to this method is that it may attract predators to the area, which may cause increased predation of calves at calving time.
Swine—Burial, composting, and rendering are the most commonly used methods of carcass disposal.

Companion animals—Check with state, local, and professional associations to obtain approved methods for carcass disposal in the area. Landfilling and incineration are the most common methods for multiple-animal disposals. Cremation, a form of incineration, allows ash residue to be returned to the owner.

A special mention should be made regarding animals that may have died as the result of poisoning or use of drugs for euthanasia. These carcasses should not be used as food for other species; therefore, rendering is not suggested. Another special mention should be made regarding catastrophic events with high mortality rates. Established methods of carcass disposal may become overwhelmed and not function adequately when large numbers of dead animals must be processed. Articles have been written to address such problems. In such cases, it is advisable to consult with the state veterinarian or the state's Environmental Protection Division.

Because of the variation in guidelines for carcass disposal from county to county and state to state, the regulatory agency that provides guidance will not be the same for all users. Sources to contact include the Department of Agriculture and the environmental agency for your state, as well as the public health department or public works. In addition, contact local renderers or landfills to determine any limitations regarding material that is acceptable for disposal.

References
3. Ill Comp Stat ch 225.